

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

EP 1 174 227 A2

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
23.01.2002 Bulletin 2002/04

(51) Int Cl.7: B26B 19/04

(21) Application number: 01115765.8

(22) Date of filing: 10.07.2001

(84) Designated Contracting States:  
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR  
Designated Extension States:  
AL LT LV MK RO SI

(72) Inventors:  
• Yamagishi, Yuuji  
c/o Matsushita Electric Works, Ltd  
Osaka 571-8686 (JP)  
• Uenishi, Yasuo  
c/o Shiga Kobayashi Seiko Co., Ltd.  
Shiga 520-2313 (JP)

(30) Priority: 18.07.2000 JP 2000217960

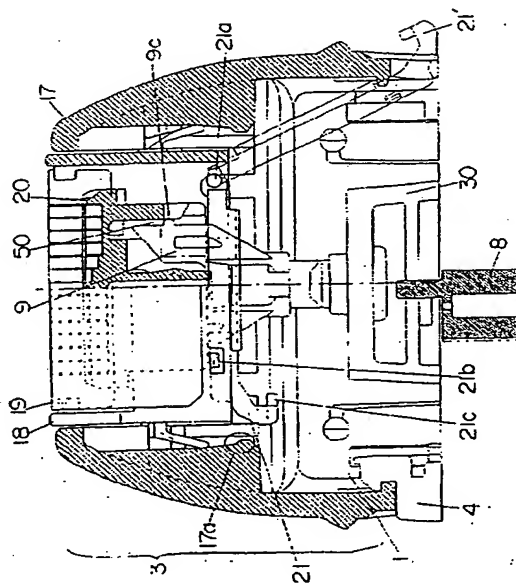
(71) Applicant: Matsushita Electric Works, Ltd.  
Osaka 571-8666 (JP)

(74) Representative: Schwabe - Sandmair - Marx  
Stuntzstrasse 16  
81677 München (DE)

### (54) Electric hair cutter or styling apparatus

(57) A rotating/reciprocating movement converting part is provided in a main body (1) and a connecting arrangement rod (9) is projected from the upper surface of the main body (1). When a shaver head (3) is mounted on the main body, the connecting arrangement is fitted to a connecting part (50) in the side of an inner cutting blade to transmit a reciprocating movement to an inner cutting blade (20). When a trimmer head is mounted on the main body, the recessed inside part of the driving rod 9 is fitted to a connecting part in the side of a movable cutting blade to transmit a reciprocating movement to a movable cutting blade. Thus, according to the present invention, problems such as an enlarged head and the deterioration of sharpness of a conventional electric hair cutter having a rotating/reciprocating movement converting part provided in the head can be overcome.

Fig. 1



EP 1 174 227 A2

**Description****BACKGROUND OF THE INVENTION****Field of the Invention**

[0001] The present invention relates to an electric hair cutter or styling apparatus which has a common main body and allows selectively changing between different hair cutting and styling devices, and in particular a trimmer head and a shaver head depending on usage.

**Description of Prior Art**

[0002] There have been hitherto proposed various kinds of types of electric hair cutters in which a head suitable for its usage can be selected and attached to a common main body. However, each of these electric hair cutters has a driving source and transmitting means for transmitting a rotating movement by the driving source in a main body side and a rotating/reciprocating movement converting part for converting the rotating movement transmitted by the transmitting means into a reciprocating movement and a cutting blade block in a head side.

[0003] However, since the rotating/reciprocating movement converting part is provided in the head side in the above described conventional electric hair cutter, the head itself is undesirably large. Accordingly, it is inconvenient to store and carry the electric hair cutter, and it is costly to order a new electric hair cutter when the old hair cutter is lost or broken. Further, in the configuration having the rotating/reciprocating movement converting part arranged in the head, it is difficult to completely suppress vibration or noise. Besides, driving energy is divided so that sharpness is disadvantageously degraded.

[0004] It is also possible to use other changeable devices for hair styling purposes and the above shortcomings would also be present there correspondingly.

**SUMMARY OF THE INVENTION**

[0005] The present invention has been devised by considering the above described drawbacks and it is an object of the present invention to provide an electric hair cutting or styling apparatus which can be easily stored or carried without vibration or noise, which has excellent sharpness or corresponding features and in which a head with a cutting or styling device can be selectively attached depending on the needs of a user. The advantages of the invention are based on an apparatus including the features of claim 1.

[0006] According to a first aspect of the present invention, there is provided an electric hair cutter which can select a shaver head or a trimmer head and exchange one for the other, the electric hair cutter comprising: a motor serving as a driving source provided in a main

body; a driver portion for converting a rotating movement by the motor into a reciprocating movement; a driving rod protruding from the upper part of the main body to perform a reciprocating movement in association with the driver portion; a shaver head having an inner cutting blade and an outer cutting blade and a trimmer head having a fixed cutting blade and a movable cutting blade, the shaver head and the trimmer head being selectively and detachably attached to the upper part of the main body, characterized in that when the trimmer head is mounted on the main body, a connecting part in the side of the movable cutting blade provided in the trimmer head is connected to the driving rod, and when the shaver head is mounted on the main body, a connecting part in the side of the inner cutting blade provided in the shaver head is connected to the driving rod. Thus, the driver portion serving as the rotating/ reciprocating movement converting part which is conventionally provided in the head side can be arranged in the main body side.

[0007] According to another aspect of the present invention, there is provided an electric hair cutter which allows selectively changing between a trimmer head and a shaver head, characterized in that a connecting part for a trimmer for transmitting the reciprocating movement by being connected to the connecting part in the side of the movable cutting blade upon mounting the trimmer head on the main body and a connecting part for a shaver for transmitting the reciprocating movement by being connected to the connecting part in the side of the inner cutting blade upon mounting the shaver head on the main body are provided on separate positions of the driving rod. Thus, different connection states can be adopted according to circumstances by using the same members.

[0008] According to a further aspect of the present invention, there is provided an electric hair cutter which allows selectively changing between a trimmer head and a shaver head, characterized in that the driving rod is formed in a substantially recessed shape, the inside part of the recessed shape of the driving rod is used as the connecting part for the trimmer and the outside part is used as the connecting part for the shaver, the connecting part in the side of the movable cutting blade is formed in a protruding shape so as to be fitted to the connecting part for the trimmer of the driving rod and the connecting part in the side of the inner cutting blade is formed in a recessed shape so as to be fitted to the connecting part for the shaver of the driving rod. Thus, the connection states respectively corresponding to the movable cutting blade in the trimmer head and the inner cutting blade in the shaver head can be realised by the driving rod in a more compacted form.

[0009] According to one further aspect of the present invention, there is provided an electric hair cutter which allows selectively changing between a trimmer head and a shaver head, characterized in that the connecting part in the part relating to the movable cutting blade lo-

3 cated in the trimmer head is provided with a groove opened toward a direction in which the driving rod moves forward. Thus, the rigidity of the connecting part in the part relating to the movable cutting blade can be decreased.

[0010] According to an aspect of the present invention, there is provided an electric hair cutter which allows to selectively change between a trimmer head and a shaver head, characterized in that the connecting part in the part relating to of the movable cutting blade arranged in the trimmer head is provided with a part protruding in a direction perpendicular to the advancing direction of the driving rod. Thus, a space is formed between the connecting part on the side of the movable cutting blade and the connecting part for the trimmer in the connecting part.

[0011] According to an aspect of the present invention, there is provided an electric hair cutter which allows selectively changing between a trimmer head and a shaver head, characterized in that a foot part opposite to the edge of the movable cutting blade is located on the extension of a center line of the driving rod when the trimmer head is mounted on the main body. Thus, since the foot part serves as a supporting point of the rotating movement of the movable cutting blade, the influence of the force of a force spring is not applied to the pressing load on the blade of the cutting blade.

[0012] According to an aspect of the present invention, there is provided an electric hair cutter which allows selectively changing between a trimmer head and a shaver head, characterized in that the shaver head is provided with a set lever for accommodating the inner cutting blade therein so as to be retractable and having a rotary supporting point part on which the set lever rotates relative to the shaver head, a hook part for engaging the set lever and a hanging part with which fingers engage. Thus, the inner cutting blade can be securely mounted in the shaver head and taken out as desired.

[0013] According to an aspect of the present invention, there is provided an electric hair cutter which allows selectively changing between a trimmer head and a shaver head, characterized in that the rotary supporting point part is formed in the shapes of columns protruding from both ends in the width direction of the set lever and a rib passes through the entire width thereof and the hook part is provided with hooks through a space at both ends in the width direction of the set lever. Thus, the distance between a pair of columns in the rotary supporting point part can be maintained to a substantially fixed and the distance between a pair of hooks in the hook part can be changed in accordance with the bending or flexure of the set lever.

[0014] According to an aspect of the present invention, there is provided an electric hair cutter which allows selectively changing between a trimmer head and a shaver head, characterized in that the hanging part is formed in a substantially circular arc shape protruding and extending longitudinally in a hook form from a side

4 opposite to the rotary supporting part in the set lever and a groove is provided in the longitudinal direction on the upper surface side of the hanging part. Thus, the fingers can be easily engaged with the hanging part and a rod type member can be engaged with the groove thus provided.

[0015] According to an aspect of the present invention, there is provided an electric hair cutter which can select a trimmer head or a shaver head and engage one for the other, characterized in that the configuration of the set lever from the hanging part to the hook part is asymmetrical with respect to a longitudinal center line. Thus, when force is exerted on the hanging part upon opening or closing the set lever, an asymmetric force is generated relative to the center line in the longitudinal direction to incline the set lever between the hanging part and the hook part.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The object and other objects and advantages of the present invention will appear more clearly from the following specification in conjunction with the accompanying drawings in which:

- Fig. 1 is a schematic sectional view showing the internal structure of a shaver head.
- Fig. 2(a) is a side view of an electric hair cutter when a trimmer head is attached to a main body.
- Fig. 2(b) is a front view of the above.
- Fig. 2(c) is a front view of the shaver head.
- Fig. 3 shows a front view of the electric hair cutter when the shaver head is attached to the main body.
- Fig. 4 shows the main body when the head is not attached to the main body,
- Fig. 4 (a) is a partly sectional view of the main body, and
- Fig. 4 (b) is an enlarged view of a driving rod in Fig. 4(a).
- Fig. 5 is a sectional view of a trimmer cutting blade block to be mounted on the trimmer head.
- Fig. 6 shows a rear view of the trimmer cutting blade block connected to the driving rod.
- Fig. 7 (a) is a schematic view showing the same state as that of Fig. 6 as viewed from the front of the driving rod.
- Fig. 7 (b) is an enlarged view of a connecting part in the side of a movable cutting blade in Fig. 7(a).
- Fig. 8 is a top view of a set lever.
- Fig. 9 is a perspective view of an alternative example of the set lever.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] In general, in the figures there is shown an electric hair cutting or styling apparatus, comprising a main body 1 and at least two head portions 2, 3, said main body 1 including an electric motor 7 and each of said head portions including a hair cutting or styling device 11, 19. The head portions are changeably connected to the main body, wherein a connecting arrangement being arranged between the electric motor 7 and the hair cutting or styling device 11, 19. The connecting arrangement is provided in and/or at the main body 1, while the head portions are bearing the hair cutting or styling devices which are formed so as to transmit a reciprocating movement from the motor 7 via the connecting arrangement to the respective hair cutting or styling device 11, 19 of the respective head portion which is currently connected to the main body, because the user needs the corresponding function of the respective head portion.

[0018] While in the following the invention is explained by referring to a trimmer and a cutter head 2, 3 as the head portions, it has to be kept in mind that also head portions with other hair cutting and styling functions can profit from the principles of the present invention. One example can be an epilation device.

[0019] Now, the present invention will be described by way of an embodiment shown in the accompanying drawings. Fig. 2(a) is a side view of an electric hair cutter having a trimmer head 2 attached to a main body 1. Fig. 2(b) is a front view of the above electric hair cutter. Fig. 2(c) is a front view of a shaver head 3.

[0020] In the trimmer head 2, the direction of the edge of a cutting blade of a trimmer cutting blade block 11 is inclined by an angle  $\alpha$  with respect to the longitudinal direction of the main body 1, as shown in Fig. 2(a). This inclination is designed by considering the maneuverability for a user. As the angle  $\alpha$  in the trimmer head, the angle desirably ranges from 30° to 60°. Of course, it is possible to use other angles. As shown in Fig. 2(c), a net type outer cutting blade is attached to the shaver head 3 so as to come into contact with an outer part.

[0021] Now, the main body 1 will be described below in detail. The main body 1 is provided with head exchange buttons 4. When the head exchange buttons 4 are pushed from outside, the head is detachable. Therefore, the trimmer head 2 and the shaver head 3 can be selectively attached to the main body 1. In this case, for the head exchange button 4, it is to be understood that the different forms, positions and numbers of exchange buttons may be employed.

[0022] Fig. 4 shows the main body 1 to which the head is not attached. Fig. 4(a) is a sectional view and Fig. 4(b) is an enlarged view of a driving rod 9 shown in Fig. 4(a). As shown in Fig. 4(a), a driving switch 5 is disposed in the front part of the main body 1. The driving switch 5 slides to control the supply of power to a motor 7 from a battery 6 accommodated in the main body 1 and con-

trol the vibration of the cutting blade block.

[0023] An eccentric shaft 8 is pressed-in and fitted to be fixed to the motor 7. The eccentric shaft 8 is fitted to a groove provided in a driver portion 30. Further, the driving rod 9 connected to the driver 30 protrudes from the upper part of the main body 1. Accordingly, a rotational movement transmitted to the eccentric shaft 8 from the motor 7 is converted into a reciprocating movement in the driver portion 30 and the reciprocating movement is transmitted to the driving rod 9.

[0024] As shown in Fig. 4(b), the driving rod 9 is formed substantially in a recessed shape or U-shape in the inner part which is used as a connecting part 9a for a trimmer and the outer part which is used as a connecting part 9b for a shaver. A pair of protruding parts 9c is formed extending in the directions of both side surfaces from the connecting part 9b for the shaver. Further, a coil type biasing spring 10 is embedded in a substantially central part of the connecting part 9a for the trimmer.

[0025] Now, the trimmer head 2 will be described in detail. Fig. 5 shows a sectional view of the trimmer cutting blade block 11 to be mounted on the trimmer head 2. Fig. 6 is a sectional view of the trimmer cutting blade block 11 in a state in which it is connected to the driving rod 9. Fig. 7(a) is a schematic view showing the above state as viewed from the front of the driving rod 9. Fig. 7(b) is an enlarged view of a connecting part 40 in the side of a movable cutting blade in Fig. 7(a).

[0026] As shown in Fig. 5, a fixed cutting blade 13 is fixed to a fixing plate 12 made of synthetic resin and a movable cutting blade 14 is similarly fixed to a guide plate 15 made of synthetic resin. A pressing spring 16 is mounted on the fixing plate 12. The fixing plate 12 comes into resilient contact with the guide plate 15 through the pressing spring 16. The movable cutting blade 14 slides relative to the fixed cutting blade 13 in accordance with the reciprocating movement transmitted from the main body 1 so that hairs are cut.

[0027] As shown in Figs. 6 and 7, the connecting part 40 in the side of the movable cutting blade provided in the guide plate 15 is fitted to the recessed or U-shaped connecting part 9a for the trimmer in the driving rod 9 protruding from the main body 1 so that the guide plate 15 is connected to the driving rod 9. A pair of protruding parts 40a are formed in the directions of both side surfaces in the connecting part 40 in the side of the movable cutting blade. Thus, the reciprocating movement of the driving rod 9 is transmitted to the movable cutting blade 14 fixed or rigid to the guide plate 15 through the protruding parts 40a.

[0028] The protruding parts 40a are formed so that a space is formed between the connecting part 40 in the side of the movable cutting blade and the connecting part 9a for the trimmer upon connection thereof. The generated space allows the connecting part 40 to freely rotate by angle  $\beta$  even during the connection as shown in Fig. 7(b). Thus, unevenness generated during assem-

bling and manufacturing steps may be tolerated to some degree. In order to tolerate the unevenness to a maximum degree in accordance with the above described method, both of the pair of protruding parts 40a may be formed in the same circular arc shapes and the centre of both of the circular arc shapes may be made to coincide with each other.

[0029] According to the present invention, the connecting part 40 in the side of the movable cutting blade is provided with a groove 40b opened toward the direction in which the driving rod 9 moves forward to generate the bend or flexure of the connecting part 40, so that unevenness in dimension or inclination for the connecting part in the side of the movable cutting blade is further tolerated. As described above, according to the present invention, while the unevenness in the advancing direction of the driving rod 9 is permitted, unevenness in other directions is substantially not tolerated. Thus, the movable cutting blade block can be conversely securely held.

[0030] Further, in order to prevent the deviation of the movable cutting blade 14, the center line of the force spring 10 embedded in the connecting part 9a for the trimmer of the driving rod 9 is aligned with the center line of the driving rod 9. Still further, the center line of the force spring 10 is set such that its extension line is superposed on a foot part 14a as the supporting point of the rotating movement of the movable cutting blade 14. In this manner, the pressing load on the edge of the cutting blade is not increased nor decreased under the influence of the force spring 10. If the above described extension line is superposed on a position closer to the blade side of the cutting blade than to the foot part 14a, the pressing load on the edge of the cutting blade will be higher than a set load. On the contrary, if the extension line is superposed on a position further away from the blade of the cutting blade than the foot part 14a, the pressing load on the edge of the cutting blade will be lower than the set load.

[0031] Now, the shaver head 3 will be described below. Fig. 1 is a schematic sectional view showing the internal structure of the shaver head 3. The shaver head 3 comprises an outer cutting blade frame 17, an inner cassette 18, an outer cutting blade 19, an inner cutting blade 20 and a set lever 21. The shaver head 3 is attached to the main body 1 by a hook extended from the head exchange button 4.

[0032] The connecting part 9b for the shaver in the outside part of the driving rod 9 protruding from the main body 1 has a pair of protruding parts 9c. Since the inner cutting blade 20 is provided with a recessed or U-shaped connecting part 50 inside the inner cutting blade, when the shaver head 3 is attached to the main body 1, the connecting part 50 in the side of the inner cutting blade is fitted to the connecting part 9b for the shaver to be connected thereto. The reciprocating movement of the driving rod 9 is transmitted to the inner cutting blade 20 through the protruding parts 9c and the

inner cutting blade 20 slides relative to the outer cutting blade 19 to cut hairs.

[0033] The protruding parts 9c of the driving rod 9 are formed as a protrusion of substantially circular arc shape as viewed from the front sides thereof. The side face part of the connecting part 50 for the shaver which comes into contact with the protruding parts 9c is formed in a substantially recessed circular arc shape as viewed from the direction of its bottom face. Accordingly, upon transmission of power, the power is smoothly transmitted to the inner cutting blade without interference of the force spring 10 embedded in the driving rod 9.

[0034] The outer cutting blade frame 17 is attached to the main body 1 by the head exchange button 4. The inner cassette 18 to which the thin outer cutting blade 19 with many cutting blade holes formed thereon is thermally welded is attached to the outer cutting blade frame 17. Although the inner cassette 18 can vertically freely slide, it is not detached from the outer cutting blade frame 17 by a stopper 17a.

[0035] In the lower part of the inner cutting blade 20, the set lever 21 is provided. A cylindrical rotary supporting point part 21a provided in the set lever 21 is inserted into the inner cassette 18, so that the set lever 21 is rotatable about the rotary supporting point part 21a. An opened set lever 21' is brought to a rotating state about the rotary supporting point part 21a as a supporting point as illustrated in Fig. 1. In an ordinary using state, a hook part 21b provided in the set lever 21 is engaged with the inner cassette 18. Accordingly, the provision of the set lever 21 allows the inner cutting blade 20 to be detachably attached to the inner cassette 18.

[0036] Fig. 8 shows a top view of the set lever 21. The rotary supporting point part 21a comprising a pair of cylindrical parts is provided at one end of the set lever and a hanging part 21c on which fingers are engaged is longitudinally formed in a hook shape at the other end opposite thereto. Further, a hook part 21b comprising a pair of hooks is provided near the hanging part 21c.

[0037] While the set lever 21 has inside a space through which the driving rod 9 passes and performs a reciprocating movement, a rib 21d is extended throughout the entire width of the rotary supporting point part 21a so as to connect a pair of cylindrical parts together. Therefore, the distance between the both cylindrical parts is substantially fixed. On the other hand, since a rib or the like is not provided between a pair of hooks in the hook part 21b, the distance between the both hooks can be freely changed due to the bending or flexure of the hook part within a certain range. Accordingly, the rotary supporting point part 21a is not unexpectedly detached from the inner cassette 18 so that the hook part 21b can be easily fitted to and detached from the inner cassette 18.

[0038] Since the hanging part 21c of the set lever 21 protrudes in a substantially circular arc shape when viewed from the top of the set lever 21, the hanging part is easily engaged with the bellies of fingers and the

amount of engagement with nails or the like is also increased. Further, a groove 21e is longitudinally provided on the upper surface side of the hanging part 21c. The above described groove 21e is used as a hook part when a thin rod or the like is employed so that the set lever 21 can be more readily opened,

[0039] Fig. 9 shows a perspective view of an alternative example of the set lever 21. One cylindrical wire is used to form a rotary supporting point part 21a, a hook part 21b and a hanging part 21c. Only the one wire from the hook part 21b to the hanging part 21c has a recessed part 21f. When force is exerted on the hanging part 21c, the unbalance in deformation is generated between the wire having the recessed part 21f and the wire having no recessed part in the hook part 21b and the hanging part 21c. As a result, the hook part 21b is slantingly inclined. Accordingly, the hook part 21b is fitted to or detached from the inner cassette 18 with ease.

[0040] As mentioned above, according to the present invention, the driver which has been hitherto arranged in the head side is provided in the main body side, so that the head can be compactly formed, the electric hair cutter can be easily carried and stored and the cost required when the head is lost or broken can be lowered.

[0041] Further, according to the present invention, since the driving source for the rotating movement and the rotating/reciprocating movement converting part are arranged in the same block in the main body, a structure can be obtained in which the vibration is hardly generated when the rotating movement is converted into the reciprocating movement. Consequently, noise and vibration can be reduced and sharpness can be improved.

[0042] Still further, according to the present invention, when the movement is transmitted to the head, it is already converted into the reciprocating movement so that the driving rod and the connecting part in the side of the head transmit the movement without changing the connection state. Therefore, an influence of the unevenness in dimension is smaller than in the case when the rotating/reciprocating movement conversion is carried out in the connecting part in the side of the head. In other words, a dimensional allowance for the unevenness in processes is improved.

[0043] Still further, according to the present invention, since the connecting parts are provided in the different positions of the same member to adopt a proper connection state according to circumstances, the connection state suitable for each head can be realised and one head can be hardly subjected to the influence such as the abrasion, deformation or the like of the other head upon use.

[0044] Still further, according to the present invention, when the trimmer head is attached to the main body, the inside part of the recessed or U-shaped driving rod can be connected to the movable cutting blade to use the electric hair cutter. In this case, since a relatively large load is exerted on the connecting part, the inside part of the recessed part or U-shaped part high in its rigidity is

employed as the connecting part. Thus, the connection state is hardly changed so that the generation of noise or the deterioration of sharpness can be prevented. When the shaver head is attached to the main body, the outside part of the recessed part of the driving rod can be connected to the inner cutting blade to use the electric hair cutter. In this case, the inner cutting blade is relatively light so that the allowance for unevenness in connection states is low. Therefore, the outside part with low rigidity is employed as the connecting part so that the above described unevenness can be tolerated.

[0045] Still further, according to the present invention, the rigidity in the connecting part in the side of the movable cutting blade can be lowered to tolerate a dimensional unevenness. It also prevents abrupt generation of excessive load on a driving source such as a motor upon the cutting.

[0046] Further, according to the present invention, since a space is formed between the connecting part in the side of the movable cutting blade and the connecting part for the trimmer in the connecting part except for the protruding part, unevenness in the inclination of the connecting part in the movable cutting blade side and the connecting part for the trimmer which is generated upon assembly of the main body or assembly of the cutting blade block can be tolerated.

[0047] Still further, according to the present invention, since the influence of the force spring is not applied to the pressing load on the edge of the cutting blade, the seizure between the fixed cutting blade and the movable cutting blade due to the increase of pressing load or the degradation of sharpness due to the decrease of pressing load can be prevented.

[0048] Still further, according to the present invention, since the inner cutting blade is securely mounted on the shaver head, when the shaver head is attached to the main body, it can be readily attached to the main body without paying attention to the connected condition of the driving rod and the inner cutting blade. Even when the shaver head is detached from the main body, the inner cutting blade is kept mounted on the shaver head, so that the loss of the inner cutting blade can be prevented. Further, the inner cutting blade can be conveniently taken out, so that the inner cutting blade can be cleaned or replaced by another one to maintain a sanitary using state.

[0049] Additionally, according to the present invention, the distance between a pair of columns in the rotary supporting point part is maintained to a substantially fixed, so that the set lever is prevented from being unexpectedly detached from the cassette of the main body. Since the distance between a pair of hooks in the hook part can be changed by the bend or flexure of the set lever, even when a side to which the set lever is attached has high rigidity, the set lever can be easily opened and closed.

[0050] Furthermore, according to the present invention, since the hanging part is easily engaged with fin-

gers, the set lever can be opened and closed without difficulty. Further, since the groove provided in the hanging part is engaged with a rod type member, the set lever can be readily opened or closed also by using a tool.

[0051] Besides, according to the present invention, since the set lever is inclined between the hanging part and the hook part, even when the attaching part of the set lever has high rigidity, the set lever can be opened or closed with ease. On the other hand, since the inclination is hardly generated between the hook part and the rotary supporting point part, there is no fear that the set lever is unexpectedly detached from the cassette of the main body.

#### Additional sheet - Reference numeral list

[0052] Fig. 1.

1	main body	
3	shaver head	20
9	driving rod	
9b	connecting part for shaver	
19	outer cutting blade	
20	inner cutting blade	
21	set lever	25
21a	rotary supporting point part	
21b	hook part	
21c	hanging part	
30	driver	
50	connecting part in the side of inner cutting blade	30

#### Claims

1. Electronic hair cutting or styling apparatus, which allows selectively changing between head portions (2, 3), comprising a main body (1) and at least two head portions (2,3), said main body (1) including an electric motor (7) and each of said head portions including a hair cutting or styling device (11, 19), the head portions being changeably connected to the main body, wherein a connecting arrangement being arranged between the electric motor (7) and the haircutting or styling device (11, 19), **characterized in that** the connecting arrangement is provided in and/or at the main body (1), while the head portions bearing the hair cutting or styling devices are formed so as to transmit a reciprocating movement from the motor (7) via the connecting arrangement to the respective hair cutting or styling device (11, 19) of the respective head portion which is temporarily connected to the main body.
2. Apparatus according to claim 1, wherein said connecting arrangement comprises,
  - a driver portion for converting a rotating movement of the motor (7) into a reciprocating move-

ment;

a driving rod (9) protruding from the upper part of the main body (1) to perform a reciprocating movement interlocking with the driver portion; said head portions being either  
 a shaver head (2) having an inner cutting blade or an outer cutting blade (19), or a trimmer head (2) having a fixed cutting blade and a movable cutting blade (13), said shaver head (3) and said trimmer head being selectively and detachably attached to the upper part of the main body (1), wherein when the trimmer head (2) is mounted on the main body (1), a connecting part (40) on the side of the movable cutting blade (14) provided in the trimmer head (2) is connected to said driving rod (9), and when the shaver head (3) is mounted on the main body (1), a connecting part (21) on the side of the inner cutting blade provided in the shaver head is connected to said driving rod (9).

3. Apparatus according to one of claims 1 or 2, wherein a connecting part for a trimmer for transmitting the reciprocating movement under the connection to the connecting part (4) on the side of the movable cutting blade (14) upon mounting the trimmer head (2) on the main body (1) and a connecting part (21) for a shaver for transmitting the reciprocating movement under the connection to the connecting part on the side of the inner cutting blade upon mounting the shaver head on the main body are provided on separate positions of the driving rod (9).
4. Apparatus according to claim 3, wherein said driving rod (9) is formed in a substantially recessed shape, the inside part (9a) having the recessed shape of the driving rod is used as the connecting part for the trimmer (2) and the outside part (9c) is used as the connecting part for the shaver (3), the connecting part on the side of the movable cutting blade (14) is formed in a protruding shape (40a; 10) so as to be fitted to the connecting part of the driving rod for the trimmer (3), and the connecting part on the side of the inner cutting blade is formed in a recessed shape so as to be fitted to the connecting part of the driving rod for the shaver (13).
5. Apparatus according to claim 4, wherein the connecting part in the side of the movable cutting blade provided in the trimmer head is provided with a groove opened toward a direction in which the driving rod moves forward, and/or in particular the connecting part on the side of the movable cutting blade provided in or at the trimmer head (2) being provided with a protruding part perpendicular to the advancing direction of the driving rod.
6. Apparatus according to any one of claims 2 to 5,

wherein a foot part opposite to the edge of the movable cutting blade (14) is located on the extension of a center line of the driving rod (9).

7. Apparatus according to any one of claims 2 to 4, wherein said shaver head (3) is provided with a set lever for accommodating the inner cutting blade therein so as to be retractable and having a rotary supporting point part on which the set lever rotates relative to the shaver head, a hook part for engaging the set lever and a hanging part for engaging fingers. 5 10
8. Apparatus according to claim 7, wherein said rotary supporting point part is formed in the shapes of columns protruding from both ends in the width direction of the set lever and a rib passes through the entire width thereof, and the hook part is provided with hooks through a space at both ends in the width direction of the set lever. 15 20
9. Apparatus according to claim 7 or 8, wherein said hanging part is formed in a substantially circular arc type protruding shape extended longitudinally in a hook shape from a side opposite to the rotary supporting point part in the set lever. 25
10. Apparatus according to claim 7, wherein the configuration of the set lever from the hanging part to the hook part is asymmetrical with respect to a longitudinal center line. 30

35

40

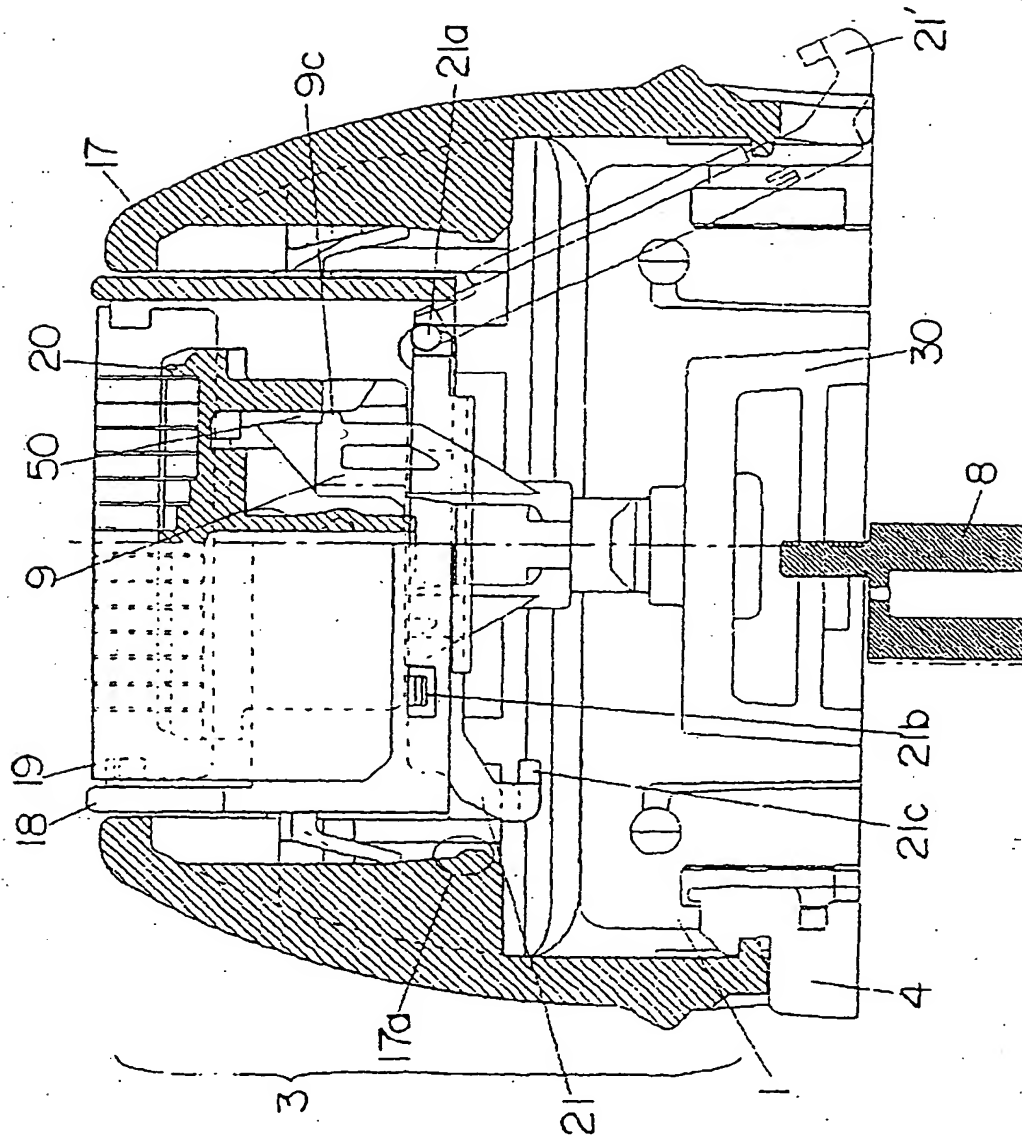
45

50

55



Fig. 1



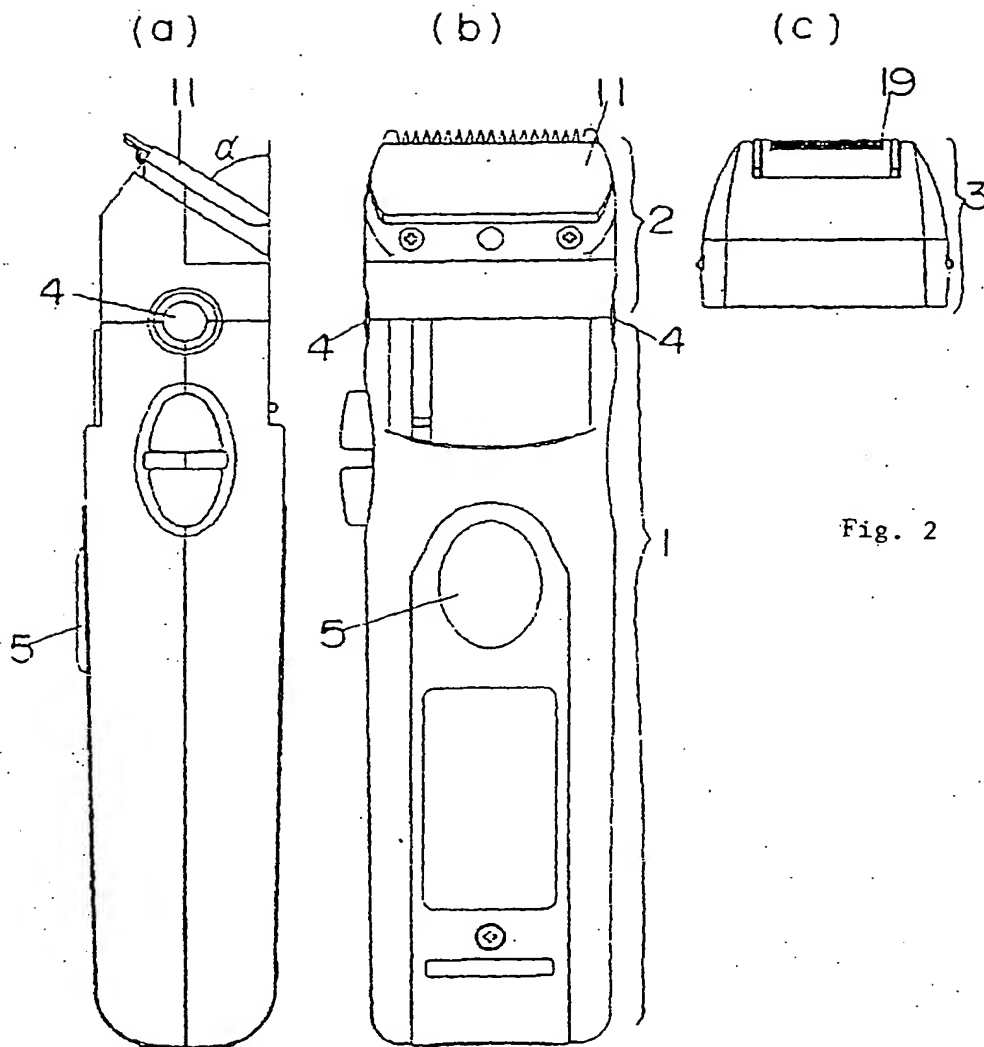
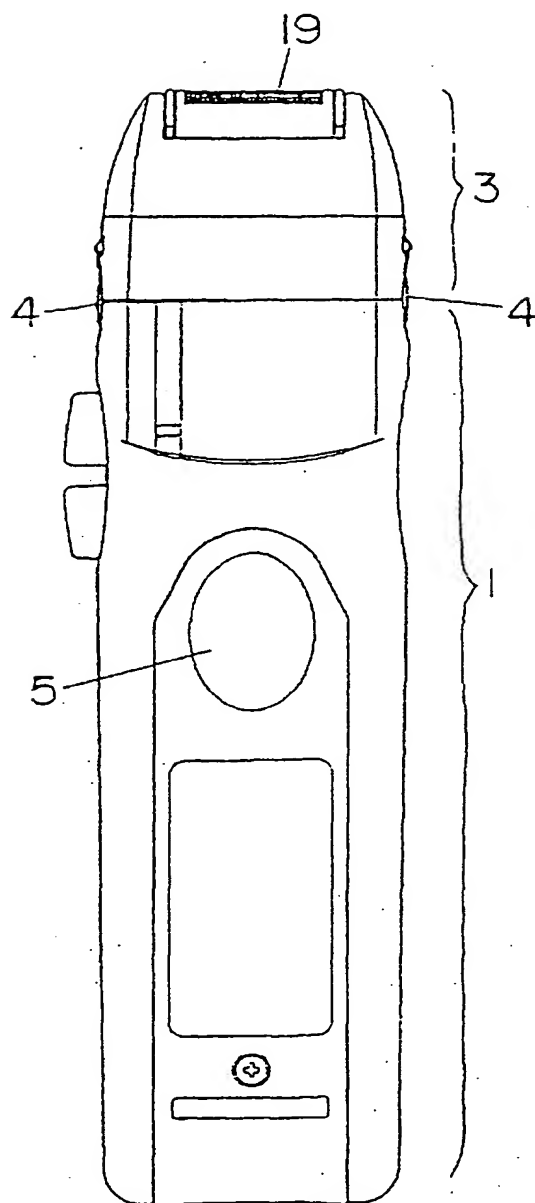


Fig. 2

Fig. 3



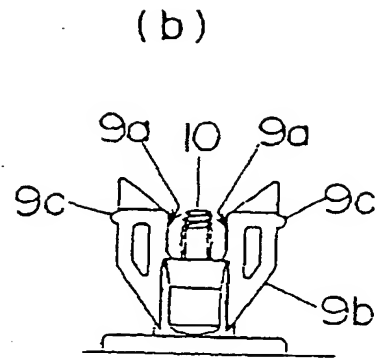
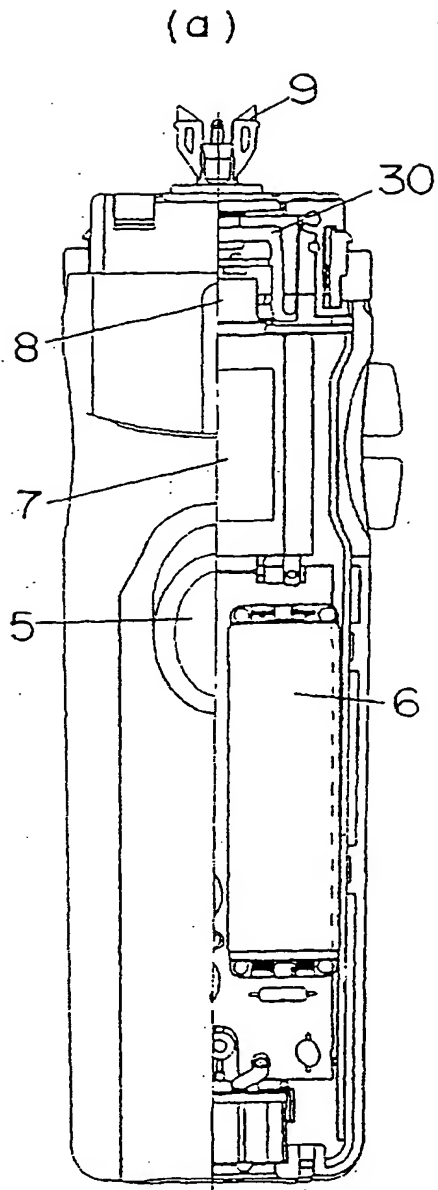


Fig. 4

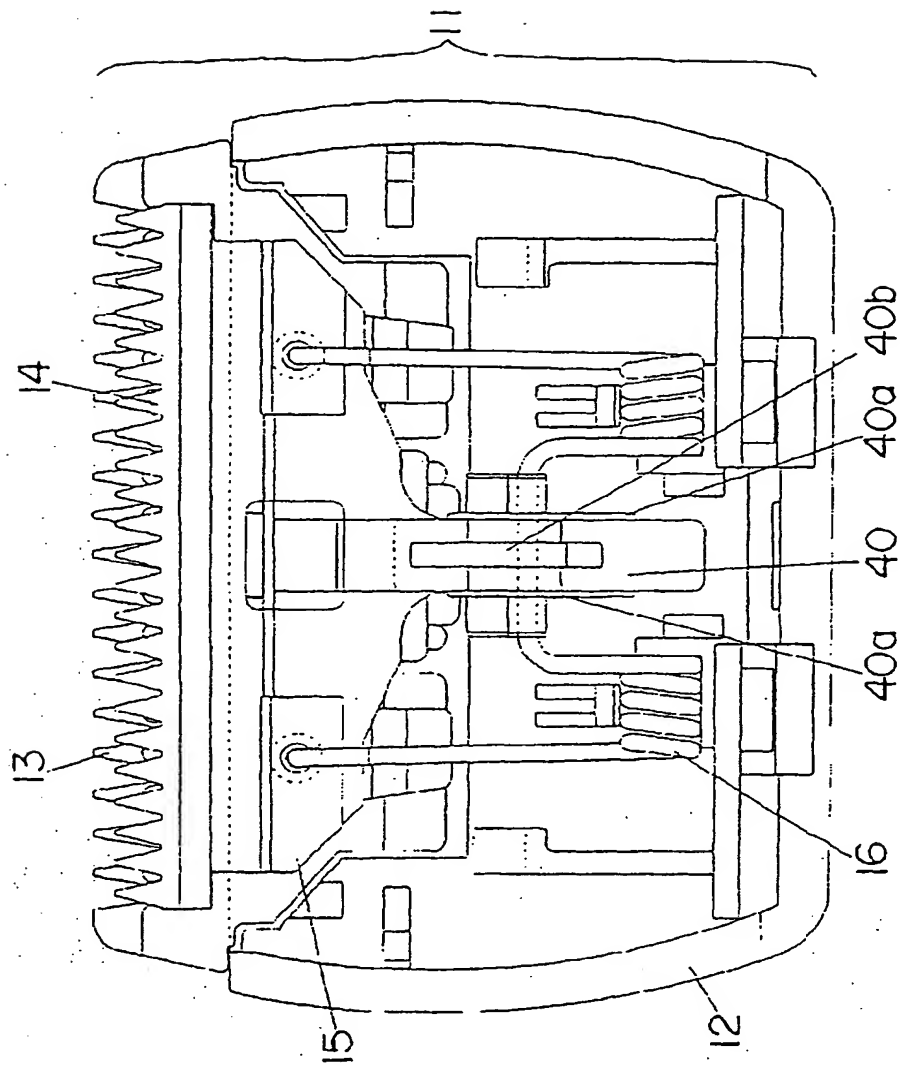
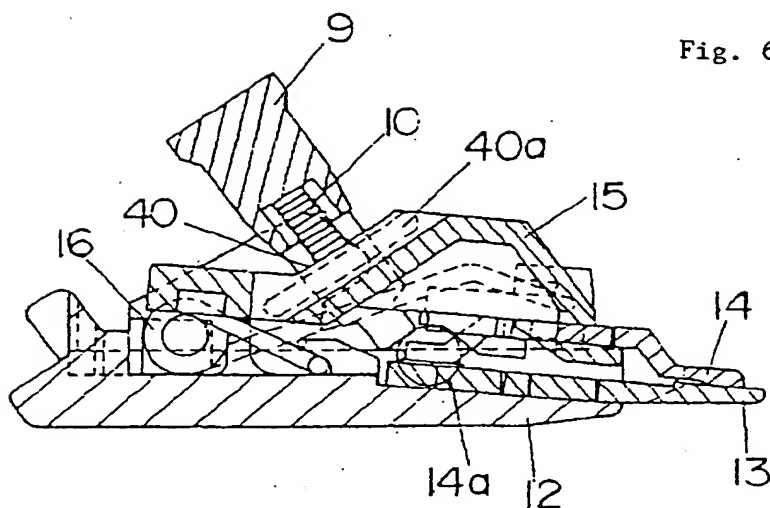


Fig. 5

Fig. 6



【図 7】

Fig. 7

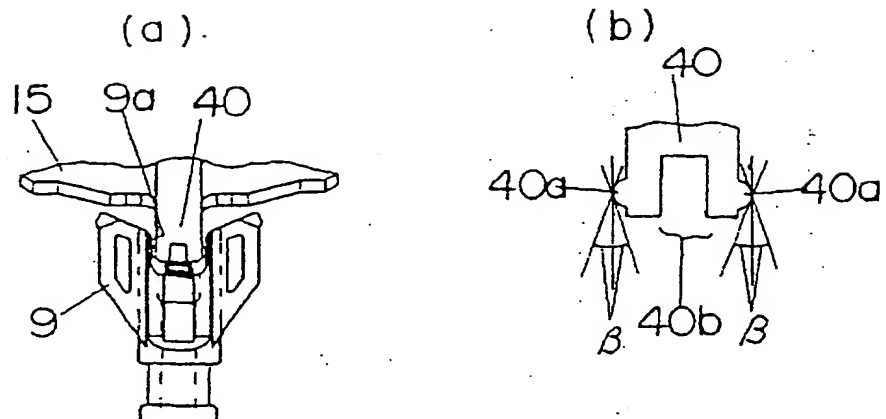
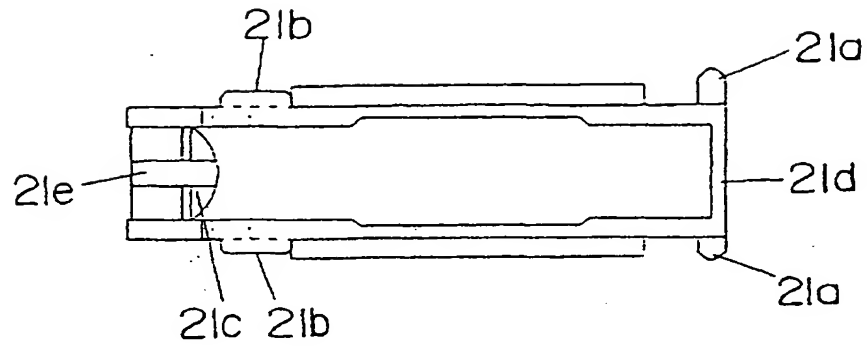
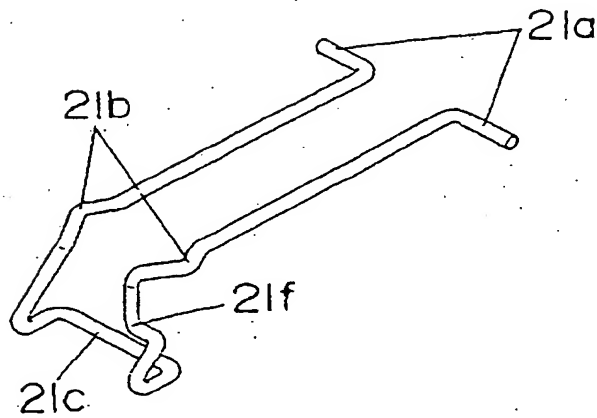


Fig. 8



【図 9】

Fig. 9



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**29.01.2003 Bulletin 2003/05**

(51) Int Cl.7: **B26B 19/10**

(43) Date of publication A2:  
**23.01.2002 Bulletin 2002/04**

(21) Application number: **01115765.8**

(22) Date of filing: **10.07.2001**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU**  
**MC NL PT SE TR**  
 Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **18.07.2000 JP 2000217960**

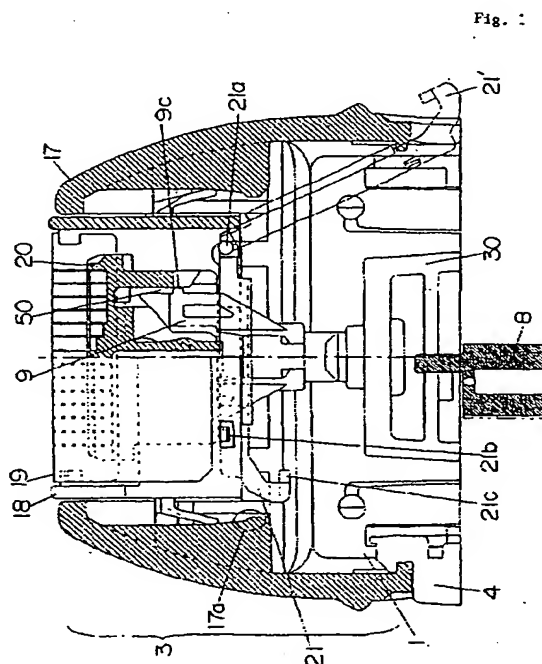
(71) Applicant: **Matsushita Electric Works, Ltd.**  
**Osaka 571-8666 (JP)**

(72) Inventors:  
 • **Yamagishi, Yuuji**  
**c/o Matsushita Electric Works, Ltd**  
**Osaka 571-8686 (JP)**  
 • **Uenishi, Yasuo**  
**c/o Shiga Kobayashi Seiko Co., Ltd.**  
**Shiga 520-2313 (JP)**

(74) Representative: **Schwabe - Sandmair - Marx**  
**Stuntzstrasse 16**  
**81677 München (DE)**

(54) **Electric hair cutter or styling apparatus**

(57) A rotating/reciprocating movement converting part is provided in a main body (1) and a connecting arrangement rod (9) is projected from the upper surface of the main body (1). When a shaver head (3) is mounted on the main body, the connecting arrangement is fitted to a connecting part (50) in the side of an inner cutting blade to transmit a reciprocating movement to an inner cutting blade (20). When a trimmer head is mounted on the main body, the recessed inside part of the driving rod 9 is fitted to a connecting part in the side of a movable cutting blade to transmit a reciprocating movement to a movable cutting blade. Thus, according to the present invention, problems such as an enlarged head and the deterioration of sharpness of a conventional electric hair cutter having a rotating/ reciprocating movement converting part provided in the head can be overcome.







European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 01 11 5765

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 3 869 790 A (IHASZ RICHARD) 11 March 1975 (1975-03-11)	1	B26B19/10
Y	* column 1, line 1 - line 27 * * column 2, line 29 - column 8, line 26; figures 1-5 *	2	
Y	--- US 5 189 792 A (IWASAKI JYUZAEMON ET AL) 2 March 1993 (1993-03-02) * column 3, line 52 - column 4, line 40; figures 1-4,6 *	2	
X	--- US 3 290 781 A (PAUL KRATZ GERD) 13 December 1966 (1966-12-13) oscillating motor * column 1, line 1 - line 60 * * column 2, line 52 - column 7, line 11; figures 1,2,15-17 *	1	
X	--- US 3 672 049 A (DEMCI MICHAEL ET AL) 27 June 1972 (1972-06-27) * the whole document *	1	
X	--- DE 198 50 919 A (MOSER ELEKTROGERAETE GMBH) 11 May 2000 (2000-05-11) * the whole document *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
X	--- DE 198 59 017 C (BRAUN GMBH) 3 February 2000 (2000-02-03) * the whole document *	1	B26B
A	--- US 6 044 558 A (WU JACK) 4 April 2000 (2000-04-04) * the whole document *	1	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 6 December 2002	Examiner Maier, M
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (03.02.02) (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 11 5765

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-12-2002

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 3869790	A	11-03-1975	AU	7051674 A	08-01-1976
			CA	1007441 A1	29-03-1977
			DE	2437101 A1	13-02-1975
			FR	2239322 A1	28-02-1975
			GB	1456875 A	01-12-1976
			JP	1146877 C	12-05-1983
			JP	50042953 A	18-04-1975
			JP	57038269 B	14-08-1982
US 5189792	A	02-03-1993	JP	3081001 B2	28-08-2000
			JP	4220282 A	11-08-1992
			DE	4142070 A1	02-07-1992
			GB	2251573 A ,B	15-07-1992
			JP	3059501 B2	04-07-2000
			JP	4250187 A	07-09-1992
US 3290781	A	13-12-1966	DE	1177976 B	10-09-1964
			DE	1149093 B	22-05-1963
			DE	1221580 B	21-07-1966
			GB	1009659 A	10-11-1965
US 3672049	A	27-06-1972	AT	310614 B	10-10-1973
			AU	453490 B	03-10-1974
			AU	3426571 A	12-04-1973
			CA	960848 A1	14-01-1975
			DE	2152082 A1	27-04-1972
			FR	2111446 A5	02-06-1972
			GB	1300020 A	20-12-1972
			NL	7114001 A ,B	25-04-1972
DE 19850919	A	11-05-2000	DE	19850919 A1	11-05-2000
			AT	224263 T	15-10-2002
			CN	1324288 T	28-11-2001
			DE	59902790 D1	24-10-2002
			WO	0027598 A1	18-05-2000
			EP	1126955 A1	29-08-2001
			ES	2160565 T1	16-11-2001
			TR	200101244 T2	21-06-2002
DE 19859017	C	03-02-2000	DE	19859017 C1	03-02-2000
			CN	1331620 T	16-01-2002
			WO	0037225 A1	29-06-2000
			EP	1140436 A1	10-10-2001
			JP	2002532213 T	02-10-2002
			US	2002000043 A1	03-01-2002

EPO FORM P0439

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82 .

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 11 5765

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-12-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6044558 A	04-04-2000	DE 29809159 U1	01-10-1998
		FR 2779987 A3	24-12-1999
		NL 1009153 C1	16-11-1999
		ZA 9804022 A	13-11-1998
		AU 5940598 A	30-09-1999
-----			

EPO FORM P0489

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82